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ABSTRACT

The brochure describes an agricultural science and education exhibition presented by the National Association of State Universities and Land-Grant Colleges in a Cannon House office building in Washington, DC on March 2, 1999. It gives background information on: three areas in which scientific research and education in the agricultural sciences should receive increased funding in order to meet the challenges posed by the global economy; the need to provide a safe and nutritious food supply; and the need to conserve resources for the future. Recent breakthroughs that are the result of agricultural science and education are highlighted. A list of exhibits and their originating institutions and a list of member institutions are appended. (MSE)

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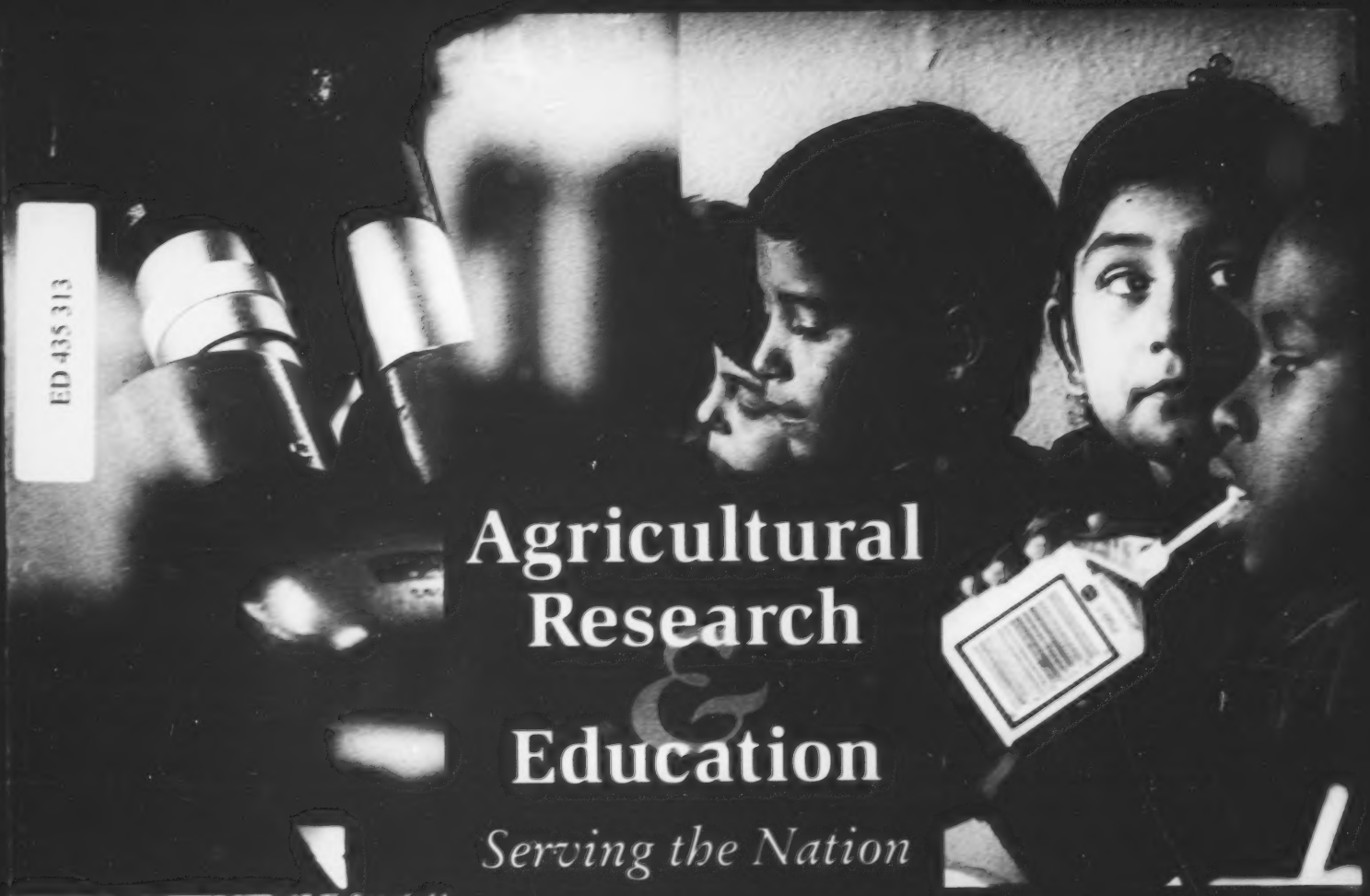


# Agricultural Research & Education

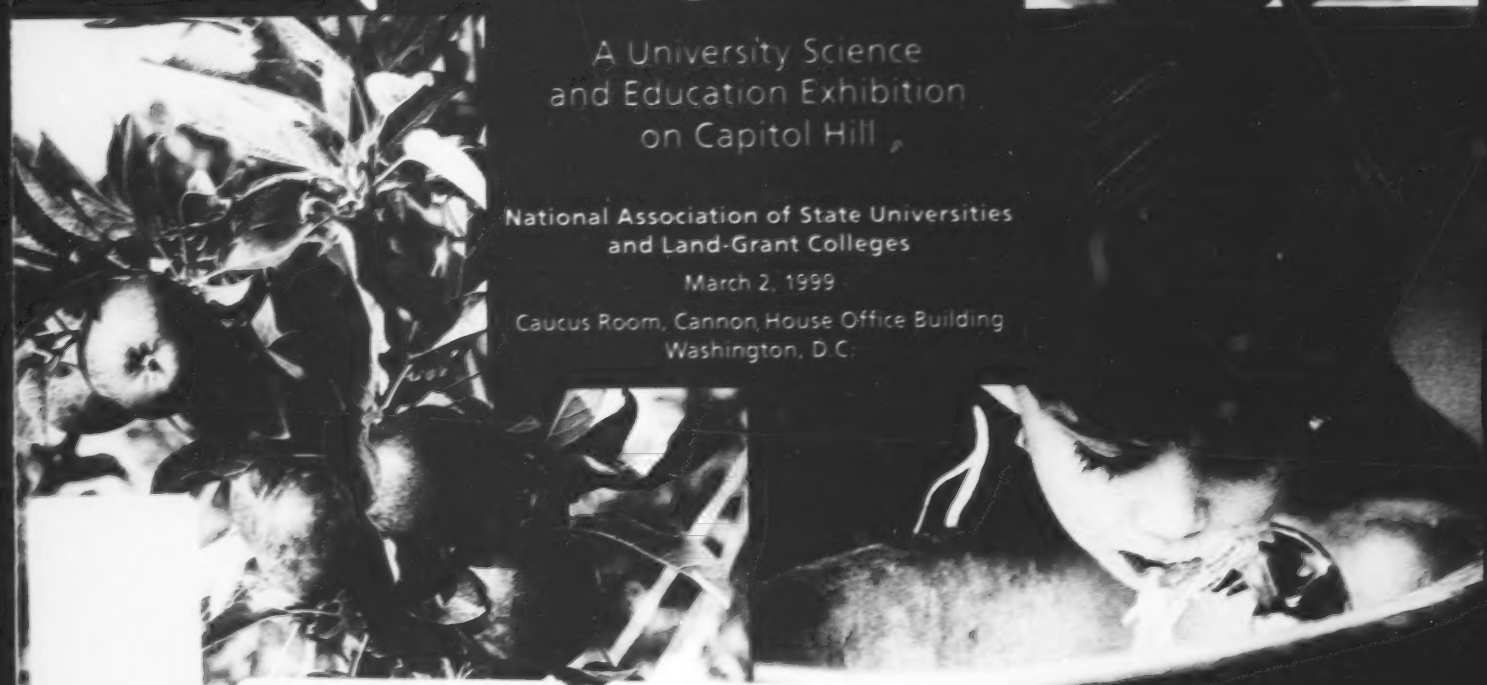
## *Serving the Nation*

A University Science and Education Exhibition on Capitol Hill

**National Association of State Universities and Land-Grant Colleges**

March 2, 1999

Caucus Room, Cannon House Office Building
Washington, D.C.



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# Agricultural Research Education

*Serving the Nation*

Through production of food and the preservation of the environment, American agriculture can help ensure a peaceful, sustainable, healthy and stable world. Food and farming are vital components of the overall national agenda now. But they should be key pieces of the national science agenda, too. Congress has had the foresight to increase budgets for research and development for many agencies. Now it must strengthen federal funding for scientific research and education in the agricultural sciences, to meet the challenges posed by the global economy, food safety, and the environment.

## Maintaining Economic Superiority in the Global Marketplace

For almost four decades, United States agricultural production has enabled an unbroken string of exports. Today, experts project that $58.5 billion in food and raw materials—one-third of the nation's production—will be sold overseas. Agriculture is one of the few areas in the nation's economy without a trade deficit.

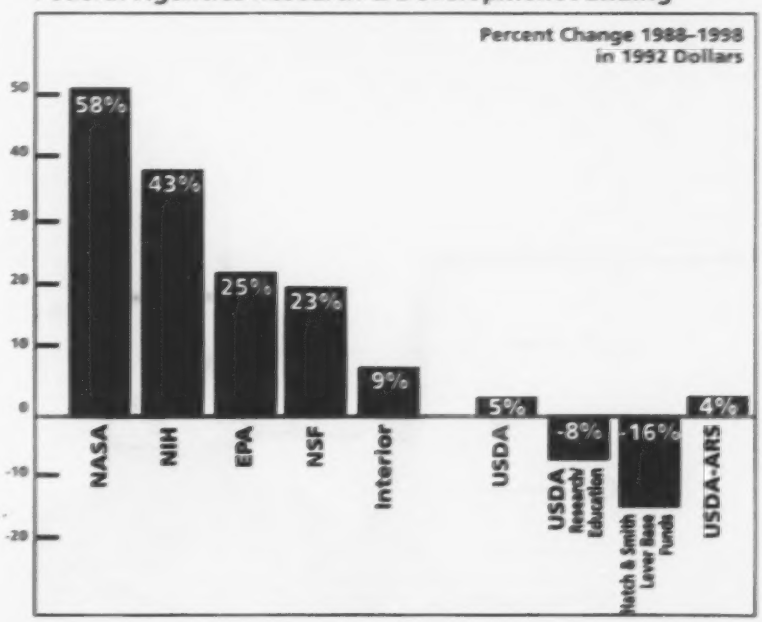
At home, these exports have a significant impact, too. Almost 20 percent of American paychecks come from agricultural and food enterprises, and 11 percent of all wages, salaries, rents and profits stem from these businesses. Yet, compared with income, Americans spend less on food than any other nation.

Much of this enormous expansion can be attributed to agricultural research. Since World War II, public investment has been responsible for 75 percent of all growth in U.S. agricultural productivity. Researchers and agricultural educators have achieved this through a variety of methods:

- Applying the science of plant and animal genetics for better quality, productivity and disease control.
- Employing new technologies, including computers, satellite-based GIS and infrared scanning systems.
- Developing non-food crops for industrial products to expand our agricultural economy.
- Fighting insects, plants and animals that damage agricultural crops.
- Providing the human capital necessary for a strong agriculture.

Still, new agricultural pests appear and others become resistant to pesticides, causing billions of dollars of damage and reducing farm profits. We need sophisticated, non-toxic, less-expensive weapons so

**Federal Agencies Research & Development Funding**

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E-mail: egouge@nasulgc.org

that our farmers can save money, stay competitive and develop foods to give America entry into lucrative niches in foreign markets. Universities are assisting on many levels, for example:

- Developing new pest-control methods, while working to find a balance between economic and environmental concerns. This type of management involves a systematic approach that incorporates genetic, cultural, biological, and chemical methods, all in keeping with the goal of living in greater harmony with the environment.
- Helping small farmers compete by developing new varieties of apples that keep two to four times longer under normal refrigeration than other apples.

Diminished federal support of university agricultural research and education continues to threaten these and other remarkable breakthroughs and economic achievements.

**Breakthrough**

## High-Tech Agriculture

**Satellite data from high-tech global positioning systems (GPS) are being used to track the location and timing of insect infestations, allowing farmers to use chemicals only when and where they're needed to control pests. The GPS data help reduce the risks posed to the environment and to farm workers by the pesticides. The system also is saving farmers between 30 and 70 percent in pesticide costs.**

## Providing a Safe and Nutritious Food Supply

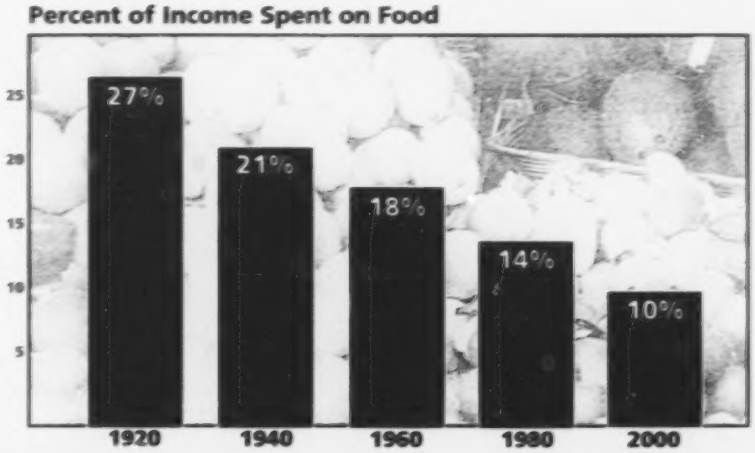
Despite the fact that the United States has the safest food supply in the world, more than 33 million Americans are afflicted by food-borne illnesses each year, and an estimated 9,000 people die. Most susceptible are the young, the old and people with compromised immune systems. Estimates of the annual health-care costs for these illnesses range from $2.9 billion to $6.7 billion.

Furthermore, most foods are nutritious, but some are much more so than others. But many Americans are unaware that eating the right foods in the right amounts is the key to good nutrition. As a result, hundreds of thousands of Americans die every year from heart attacks, strokes, diabetes and other illnesses that can be linked at least partially to faulty diets.

Cooperative Extension programs are providing research-based solutions to some of these problems by teaching preparation and handling techniques, promoting dietary adjustments, and developing cutting-edge surveillance technology for our food supply. Innovative solutions include development of:

- A sensitive, reliable test for *E. coli* bacteria that can be completed in 8 hours rather than the two days previously needed. The test, which can detect even a single *E. coli* bacterium, can allow consumers to be warned more quickly about this potentially deadly contaminant.
- Food-safety programs for daycare providers across the country, with training on the causes of food-borne illnesses and instruction in food storage and sanitary practices that help keep food safe for children.
- Commercial-sized food irradiators that can reduce microbial contamination in meat and poultry, nearly eliminating the risk of food-borne illness and doubling a product's shelf life.

**Percent of Income Spent on Food**



Up to 95 percent of food-borne illnesses and deaths can be prevented, some by low-cost interventions, others by sophisticated initiatives. But all require increased efforts from agricultural research and extension programs.

## Conserving our Natural Resources for the Future

Conservation and economic growth and development create a delicate balance. Agriculture challenges the environment because it produces waste, uses vast amounts of land and water, and employs chemicals to increase yields and kill pests.

Today, scientists are helping the agricultural industry remain competitive while dealing effectively with fragile ecosystems and continual urban expansion. They are enabling farmers to reuse and recycle resources, and, thanks to biotechnology, are helping them to increase agricultural production dramatically without endangering the environment. Farmers increasingly are able to produce more crops with more nutrition from the same land base—crops that are safe, and require less water and fewer pesticides. University researchers and educators, for example, are helping to:

- Significantly reduce soil erosion through new "no-till" or "reduced-till" planting methods, replacing the deep field-tilling techniques that leave topsoil vulnerable to wind and water erosion.
- Protect water quality and water supplies through natural and novel methods, for example using algae filters to remove 90 percent of the phosphorus from wastewater in less than 24 hours, and developing a bacterial-treatment system that decreases the nitrate concentrations in stream and river water by 90 percent.

Reclaiming and preserving our rivers, streams, forests, and lands are costly processes that involve not only committed volunteers, but also sophisticated scientific intervention and federal support and leadership.

**Breakthrough**

### Safe Seafood

**When all 5,000 licensed seafood processors in the United States recently were required to implement a new product-inspection process, a national alliance of federal, state, academic and private organizations worked together to train industry and regulatory personnel. Training in the new Hazard Analysis and Critical Control Points method was provided by land-grant institutions in many states, including Florida, Louisiana, Idaho, New Jersey and North Carolina.**

**Breakthrough**

### Battling Cancer

**Researchers in Illinois are extracting cancer-fighting chemicals found naturally in plant cells and using them to produce beneficial anti-tumor compounds. These products now can be made in a lab, whereas they once were available only when certain plants were in season. Scientists at Cornell have found that selenium, a nutrient found in meats, fish, and cereals, can help reduce the risk of cancer.**

# Renewing the Nation's Commitment to Agricultural Research, Academic, and Extension Programs

Agriculture's pressing priorities are to augment yields, to produce more nutritious and safer food, to help find solutions to environmental problems, and to develop skills to manage risk in the global marketplace. To address these priorities requires society-ready college graduates with the appropriate academic training. These needs, however, will require additional resources to meet increasingly complex challenges.

In the years since its founding, America continually has renewed its commitment to agriculture. In the 1970s, though, public support of academic agricultural research, extension and teaching began to erode. Since 1988, this funding has declined by eight percent in constant dollars. Base funds have eroded by 16 percent. These are the funds that support the scientists and extension educators who can respond quickly and effectively to unexpected problems that arise for producers and consumers. These funds represent the federal support for the state-county-national partnership and leverage more than four dollars for every dollar of base support.

Without this critical funding to conduct research on everything from pest management to controlled-atmosphere storage, the world's most abundant and safe food supply is at risk from new disease, new pests, and less-than-efficient storage and handling techniques. We are endangering the environment, and we are also jeopardizing the knowledge available to established scientists as well as to students—the next century's agricultural and environmental researchers—who will work in academia, in industry, and in federal laboratories.

Shortchanging the food and agricultural system with its unique USDA/land-grant university partnership at this juncture would interrupt the advances of the past half-century and impede our future progress.

***At a time when America's farmers and ranchers face an increasingly competitive world market, and as historic farm programs phase down, our agricultural research programs are more important than ever.***

**—Secretary of Agriculture Dan Glickman**

**Selected Fiscal Year 1998 Cooperative State, Research, Education, and Extension Service/USDA Awards**

**ALABAMA**
Alabama A&M University
Auburn University
Tuskegee University
University of Alabama
University of South Alabama

**ALASKA**
University of Alaska

**AMERICAN SAMOA**
American Samoa Community College

**ARIZONA**
Arizona State University
Dine College
Northern Arizona University
University of Arizona

**ARKANSAS**
University of Arkansas
University of Arkansas at Pine Bluff

**CALIFORNIA**
California Polytechnic State University
California State University-Fresno
Hartnell Community College
Humboldt State University
University of California
University of California, Berkeley
University of California, Davis
University of California, Riverside
University of California, San Diego
University of California, Santa Barbara

**COLORADO**
Colorado School of Mines
Colorado State University
Trinidad State Junior College

**CONNECTICUT**
Connecticut Agricultural Experiment Station
Eastern Connecticut State University
University of Connecticut

**DELAWARE**
Delaware State University
University of Delaware

**DISTRICT OF COLUMBIA**
Georgetown University
University of the District of Columbia

**FEDERATED STATES OF MICRONESIA**
College of Micronesia

**FLORIDA**
Florida A&M University
Florida International University
Rollins College
University of Florida
University of Miami
University of South Florida

**GEORGIA**
Agnes Scott College
Clark Atlanta University
Emory University
Fort Valley State University
University of Georgia

**GUAM**
University of Guam

**HAWAII**
University of Hawaii
University of Hawaii at Manoa

**IDAHO**
University of Idaho

**ILLINOIS**
Southern Illinois University
University of Illinois
University of Chicago

**INDIANA**
Indiana University
Purdue University

**IOWA**
Iowa State University
Northeast Iowa Community College
University of Iowa
University of Northern Iowa

**KANSAS**
Haskell Indian Nations University
Kansas State University
University of Kansas

**KENTUCKY**
Kentucky State University
University of Kentucky
Western Kentucky University

**LOUISIANA**
Louisiana State University and A&M College
Louisiana State University
Southern University and A&M College

**MAINE**
University of Maine at Orono

**MARYLAND**
Johns Hopkins University
St. Mary's College of Maryland
University of Maryland, College Park
University of Maryland Eastern Shore

**MASSACHUSETTS**
Boston University
Harvard University
Tufts University
University of Massachusetts

**MICHIGAN**
Bay Mills Community College
Michigan State University
Michigan Technological University
Siena Heights College
Western Michigan University

**MINNESOTA**
Fond du Lac Tribal and Community College
Leech Lake Tribal College
Moorhead State University
South Central Technical College
University of Minnesota

**MISSISSIPPI**
Alcorn State University
Mississippi State University
Mississippi Valley State University
University of Southern Mississippi

**MISSOURI**
Kirksville College of Osteopathic Medicine
Lincoln University
Southeast Missouri State University
University of Missouri
Washington University

**MONTANA**
Blackfeet Community College
Dull Knife Memorial College
Fort Belknap College
Fort Peck Community College
Little Big Horn College
Montana State University
Salish Kootenai College
Stone Child College
University of Montana

**NEBRASKA**
Creighton University
Nebraska Indian Community College
University of Nebraska

**NEVADA**
University of Nevada, Reno

**NEW HAMPSHIRE**
University of New Hampshire

**NEW JERSEY**
Rutgers, The State University of New Jersey

**NEW MEXICO**
New Mexico State University
University of New Mexico

**NEW YORK**
Cornell University
New York University
State University of New York
Union College
University of Albany

**NORTH CAROLINA**
Duke University
East Carolina University
North Carolina A&T State University
North Carolina State University
Shaw University
University of North Carolina
Wake Forest University

**NORTH DAKOTA**
Fort Berthold Community College
Little Hoop Community College
North Dakota State University
Sitting Bull College
Turtle Mountain Community College
United Tribes Technical College
University of North Dakota

**NORTHERN MARIANAS**
Northern Marianas College

**OHIO**
Case Western Reserve University
College of Wooster
The Ohio State University
University of Cincinnati

**OKLAHOMA**
Langston University
Oklahoma State University

**OREGON**
Oregon State University

**PENNSYLVANIA**
Duquesne University
The Pennsylvania State University
University of Pennsylvania
University of Pittsburgh
Wilkes University

**PUERTO RICO**
Cayey University College
Inter American University of Puerto Rico
University of Puerto Rico

**RHODE ISLAND**
Brown University
University of Rhode Island

**SOUTH CAROLINA**
Clemson University
Medical University of South Carolina
South Carolina State University
University of South Carolina

**SOUTH DAKOTA**
Augustana College
Cheyenne River Community College
Oglala Lakota College
Sinte Gleska University
Sisseton Wahpeton Community College
South Dakota State University

**TENNESSEE**
East Tennessee State University
Tennessee State University
University of Tennessee

**TEXAS**
Baylor College of Medicine
Palo Alto College
Prairie View A&M University
Rice University
Texas A&M University
Texas Tech University
University of Houston-Downtown
University of North Texas
University of Texas

**UTAH**
Brigham Young University
University of Utah
Utah State University

**VERMONT**
University of Vermont

**VIRGIN ISLANDS**
University of the Virgin Islands

**VIRGINIA**
College of William and Mary
Virginia Commonwealth University
Virginia Polytechnic Institute and State University
Virginia State University

**WASHINGTON**
University of Washington
Washington State University

**WEST VIRGINIA**
West Virginia University

**WISCONSIN**
College of the Menominee Nation
Lac Courte Oreilles Ojibwa Community College
University of Wisconsin

**WYOMING**
University of Wyoming

Board on Agriculture and Council on Governmental Affairs
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**LISTING**
**OF THE**
**EXHIBITS**
**FOR NASULGC'S**
**SECOND ANNUAL AGRICULTURAL RESEARCH AND EDUCATION**
**SERVING THE NATION:**
**A University of Science Exhibition on Capitol Hill**
**March 2, 1999**

1. *AASCARR and Challenge Grants* -- AASCARR Institutions
2. *Controlled Environment Agriculture* -- University of Arizona
3. *Cornell University's Apple Program: From Prospecting to Breeding to Healthy Finger Foods* -- Cornell University
4. *Growing New York's Food System: Linking Food, Farming and Economic Development* – Cornell University
5. *21st Century Raw Materials Provide New Foods and Products* -- Iowa State University
6. *Policy Analysis for Decision Makers* – Iowa State University
7. *New Technology Promises Safer Food for All Americans* -- The Ohio State University
8. *Integrating Remote Sensing Technologies into Agriculture Management* -- SAES/USDA-CSREES National Environmental Initiative
9. *Sustainable Agriculture – Field Mapping* – University of Georgia and Auburn University
10. *Stopping Spotted Wilt* -- University of Georgia
11. *Agricultural Education, Research, and Extension Programs in the Texas High Plains* -- West Texas A&M University
12. *University of Maine Cooperative Extension Compost School* – University of Maine

13. *Multi-disciplinary, Federal-State-Industry Partnership in Research and Development Resulting in an Up-Scale Consumer Product: Sustainable Pork* – Texas Tech University

14. *1890 Land-Grant Universities: Impacting Agriculture, People, Families and Communities* – 1890 Land-Grant Universities

15. *Applied Biotechnology in Agriculture, Forestry, and Veterinary Medicine* – Mississippi State University

16. *The Institute of Food Science and Engineering: Fueling the Economic Engine of Arkansas* – University of Arkansas

17. *Bringing Technology to Natural Resource Management: The Arkansas Forest Resources Center* – University of Arkansas

18. *Food Safety and Quality Protection Programs in the Pacific Northwest* – Washington State University and the University of Idaho

19. *Improving Cost Estimation Skills of Students in Landscape Horticulture via Computer Simulation* – Southern Illinois University at Carbondale

20. *A Tribal College's Land-Grant Vision* – Cheyenne River Community College

21. *California State University, Fresno Clinic Program – From Theory to Practice* – California State University, Fresno

22. *Animal Waste Management Consortium* – University of Missouri, North Carolina State University, Michigan State University, Iowa State University, Oklahoma State University, and Purdue University

23. *Improving Meat Safety with Corn-Based Polylactic Acid* – University of Missouri-Columbia

24. *Louisiana Crunch & Munch: Operation Full Stop – the Formosan Subterranean Termite Program* – Louisiana State University

25. *The Return of the American Chestnut* – West Virginia University

26. *Controlling Honeybee Mites with Essential Oils* – West Virginia University

27. *Protection of Flowering Dogwood from Catastrophic Diseases* – University of Tennessee

28. *Safe, Sustainable U. S. Food and Fiber System* – University of Florida

29. *Better Foods for Better Health* – Texas A&M University System

30. *Nutrient Management for Agricultural Profitability and Water Quality Protection: Science-Based Solutions for Delaware and Maryland Agriculture* – University of Delaware and University of Maryland

31. *Water Quality Education and Research Successes* – North Carolina State University

32. *Agripedia: An On-Line Agricultural Information Resource* – University of Kentucky

33. *PRECISION AGRICULTURE: From Information Technology Revolution to Rural Development* – University of Minnesota

34. *Sustaining Renewable Resources Through Research and Outreach* – The Pennsylvania State University

35. *Water Quality Links to Purdue Agriculture and Natural Resources* – Purdue University

36. *Improving Ground Water Quality Through Implementation of Best Management Practices* – University of Nebraska-Lincoln

37. *Environmental Restoration Through Agricultural Research* – University of California, Davis

38. *Citrus Science in the 21st Century* – University of California, Riverside

39. *Idaho WIRE Program* – University of Idaho

40. *Value-Added Products from Pecans Through Extraction Processing* – Oklahoma State University

41. *Educational Technology for K-12* – New Mexico State University

42. *Woodlands Tribal College Nutrition Education Demonstration Project* – Lac Courte Oreilles Ojibwa Community College, College of the Menominee National Community College, Leech Lake Tribal Community College, White Earth Tribal Community College, Fond du Lac Tribal and Community College, and Turtle Mountain Community College

43. *Native American Pastoral Textiles* – The Institute of American Indian Arts

44. *Corns & Soybeans – The Benefits of Research Are All Around Us* – University of Illinois

45. *Eating for Health – "Functional Foods"* – University of Illinois

46. *Change Comes to Tobacco Country* – Virginia Polytechnic Institute and State University

47. *The National Research Initiative Competitive Grants Program* – U. S. Department of Agriculture

48. *EFNEP -- Celebrating Thirty Years of Success* – U. S. Department of Agriculture